

REMARKS

Claims 1-9 are pending in the present application and stand rejected in the Outstanding Office Action. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 102

The Outstanding Office Action states that Claims 1-7 are rejected under 35 U.S.C. §102(b) as being anticipated by Raney et al. U.S. 4,967,055. The Office Action states that Raney et al. teaches the tip as being integral with swirl ring, which ring has secondary gas holes for surrounding and stabilizing the plasma flow, and swirl holes for providing a swirling primary gas flow. Applicants respectfully request reconsideration of these rejections in light of the following remarks.

Claims 1-7 have been amended to clarify that the swirl holes/passages, secondary gas holes/passageways, and/or plasma gas passageways, are **formed through the electrically conductive body** of the tip. Having a single, electrically conductive body formed with holes or passageways for plasma gas, swirl gas, and/or secondary gas, the tip not only functions as a conventional tip or nozzle having positive (or anode) potential, but also serves to provide proper gas distribution and regulation of the plasma stream and/or the secondary gas, thereby dispensing with the need for a separate swirl ring to provide a more stable plasma gas and for other elements to form a secondary gas passage.

In contrast, the tip element 100 of Raney et al. does not function as both a conventional tip and a swirl ring. As shown in Figure 6, the secondary gas holes

118-128 or the swirl holes 134, 136 and 138 are provided in the swirl ring 114, which is made from an electrically insulating material. The tip element 100, made of an electrically conductive material to provide positive potential, does not provide any swirl gas passage or secondary gas passage. Though the tip element and the swirl ring are physically connected, the tip and the swirl ring are still two separate elements, which require separate manufacturing processes, followed by an assembling step. Therefore, the combination of the conductive tip element 100 and the non-conductive swirl ring 114 of Raney et al. cannot anticipate the tip as defined in Claims 1-7. Accordingly, Applicants respectfully request that these claim rejections be withdrawn.

REJECTION UNDER 35 U.S.C. § 103

The Outstanding Office Action states that Claims 8-9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Raney et al. The Office Action states that it is obvious that if the set of tips in Claim 8 were a set of identical replacement tips, then the flow ratios would remain constant. Applicants respectfully request reconsideration of these rejections in light of the following remarks.

Claim 8 has been amended to clarify that the set of tips are a set of different tips having an electrically conductive body and at least one swirl passageway and at least one secondary gas passageway formed through the electrically conductive body.

As explained in the specification, with different operating currents, a ratio of a flow rate of the plasma stream through the central exit orifice 44 to a flow rate of the

secondary gas through the secondary gas holes 64 is preferably adjusted to produce an optimum plasma stream. Accordingly, with a different current level, the size of the central exit orifice 44 and/or the size and number of secondary gas holes 64 are adjusted for the optimum plasma stream, while the swirl holes 62 may be adjusted or may remain constant according to specific flow requirements. Since the tip as claimed in Claim 8 has at least one swirl passageway and the secondary gas passageway formed in the tip, the flow ratio of secondary gas to plasma gas can be easily determined and thus the flow ratio across a range of operating amperages can be easily maintained by **using a set of different tips**.

Raney et al. cannot render Claim 8 obvious because Raney et al., as discussed earlier, does not disclose a tip having a central exit orifice, a swirl hole and/or a secondary gas in one electrically conductive body. Therefore, in Raney et al., the adjustment of the flow ratio cannot be achieved by the use of a set of tips, whether identical or different. Accordingly, Applicants respectfully request that the rejections of Claims 8 and its dependent claim, Claim 9, be withdrawn.

CONCLUSION

It is believed that all of the stated grounds of objection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding objections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is

respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (314) 726-7524.

Respectfully submitted,

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